AMENDMENTS TO THE CLAIMS:

1. (Currently amended) A data storage element, comprising:

a substrate comprising a semiconductor material;

a metal oxide layer comprising an electrically insulating rare earth metal oxide disposed upon a surface of said substrate, said metal oxide layer having a thickness in a range from 50Å to 500Å ~~comprising a predetermined current-voltage profile for an applied voltage~~ and forming an active element of said data storage element;

a conductive material disposed upon said metal oxide layer;

a first electrode electrically connected to said conductive material; and

a second electrode connected to said substrate, to form said data storage element.

2. (Original) The data storage element as set forth in Claim 1, wherein said metal oxide comprises lanthanum oxide.

3. (Original) The data storage element as set forth in Claim 1, wherein said metal oxide comprises a mixture of lanthanum oxide and aluminum oxide.

4. (Original) The data storage element as set forth in Claim 3, wherein said conductive material comprises metallic aluminum.

5. (Previously presented) The data storage element as set forth in Claim 1, wherein said metal oxide comprises at least one of:

lanthanum oxide, and

a mixture of lanthanum oxide and aluminum oxide, and said conductive material comprising metallic aluminum.

6. (Currently amended) The data storage element as set forth in Claim 1, wherein said metal

oxide layer has a thickness in a range of 150 ~~10~~ Angstroms to 180 ~~10,000~~ Angstroms.

7. (Canceled)

8. (Original) The data storage element according to claim 1, wherein said conductive material comprises polysilicon.

9. (Original) The data storage element according to claim 1, wherein said conductive material comprises Aluminum.

10. (Currently amended) A data storage element, comprising:

a substrate comprising a semiconductor material having a source region and a drain region formed in a surface of said substrate;

a layer of metal oxide disposed upon said surface of said substrate and between said source region and said drain region, said metal oxide comprising at least one metal which has a plurality of oxidation states, said metal oxide layer having a thickness in a range from 50Å to 500Å ~~comprising a predetermined capacitance-voltage profile for an applied voltage~~ and forming an active element of said data storage element;

a conductive layer disposed upon said layer of metal oxide;

a first electrode electrically connected to said conductive layer;

a second electrode connected to said source region; and

a third electrode connected to said drain region, to form said data storage element.

11. (Currently amended) The ~~A~~ data storage element as set forth in Claim 10, wherein said semiconductor material comprises ~~being~~ n-doped silicon, said metal oxide comprising at least one of lanthanum oxide and a mixture of lanthanum oxide and aluminum oxide, and said conductive layer comprising metallic aluminum.

12. (Original) The data storage element as set forth in Claim 10, wherein said semiconductor material comprises n-doped silicon.

13. (Original) The data storage element as set forth in Claim 10, wherein said metal oxide comprises at least one of lanthanum oxide, and a mixture of lanthanum oxide and aluminum oxide.

14. (Original) The data storage element as set forth in Claim 10, wherein said conductive layer comprises metallic aluminum.

15-23. (Canceled)

24. (Currently amended) A memory, comprising:

a rare-earth based memory element for storing data based on hysteresis and current-voltage characteristics thereof, said rare-earth based memory element comprising:

a metal oxide layer comprising an electrically insulating rare earth metal oxide disposed upon a surface of said substrate, said metal oxide layer having a thickness in a range from 50Å to 500Å ~~comprising a predetermined capacitance-voltage profile for an applied voltage~~ and forming an active element of said rare-earth based memory element.

25. (Currently amended) The memory as set forth in Claim 24, wherein said memory element further comprises:

a conductive material disposed upon said metal oxide layer.

26. (Original) The memory as set forth in Claim 25, wherein said metal oxide comprises lanthanum oxide.

27. (Original) The memory as set forth in Claim 25, wherein said metal oxide comprises a

mixture of lanthanum oxide and aluminum oxide.

28. (Original) The memory as set forth in Claim 27, wherein said conductive material comprises metallic aluminum.

29. (Previously presented) The memory as set forth in Claim 25, wherein said metal oxide comprises at least one of:

lanthanum oxide, and

a mixture of lanthanum oxide and aluminum oxide, and said conductive material comprising metallic aluminum.

30. (Original) The memory as set forth in Claim 25, wherein said substrate comprises n-doped silicon, said metal oxide comprising at least one of lanthanum oxide and a mixture of lanthanum oxide and aluminum oxide, and said conductive material comprising metallic aluminum.

31. (Previously presented) The data storage element of claim 1, wherein the metal oxide layer changes internally as a function of an applied voltage.

32. (Canceled)

33. (Previously presented) The data storage element of claim 1, wherein when a voltage is applied between the first and second electrodes, beyond a threshold voltage, charge is accumulated in the metal oxide layer, thereby shifting current-voltage and capacitance-voltage characteristics, and

wherein upon reversal of the applied voltage, beyond a second threshold voltage, the charge in the metal oxide layer is discharged, thereby restoring original current-voltage and capacitance-voltage requirements.

34. (Previously presented) The data storage element of claim 10, wherein the metal oxide layer changes internally as a function of an applied voltage.

35. (Canceled)

36. (Previously presented) The data storage element of claim 10, wherein when a voltage is applied between the first and second electrodes, beyond a threshold voltage, charge is accumulated in the metal oxide layer, thereby shifting current-voltage and capacitance-voltage characteristics, and

wherein upon reversal of the applied voltage, beyond a second threshold voltage, the charge in the metal oxide layer is discharged, thereby restoring original current-voltage and capacitance-voltage requirements.

37. (Previously presented) The memory of claim 24, wherein said memory element comprises a metal oxide layer on a substrate, and

wherein the metal oxide layer changes internally as a function of an applied voltage.

38. (Canceled)

39. (Previously presented) The memory of claim 24, wherein when a voltage is applied to said memory, beyond a threshold voltage, charge is accumulated in the memory element, thereby shifting current-voltage and capacitance-voltage characteristics, and

wherein upon reversal of the applied voltage, beyond a second threshold voltage, the charge in the memory is discharged, thereby restoring original current-voltage and capacitance-voltage requirement.

40. (New) The data storage element as set forth in Claim 1, wherein said data storage element comprises a charging voltage requirement of less than 7V.

41. (New)The data storage element as set forth in Claim 1, wherein said metal oxide layer is formed directly on said substrate and said conductive material is formed directly on said metal oxide layer.

42. (New) The data storage element as set forth in Claim 1, wherein said data storage element comprises a charge retention time of at least 12 hours.

43. (New) The data storage element as set forth in Claim 1, further comprising:

a host oxide layer, said rare earth metal oxide layer homogeneously mixed with said host oxide layer.

44. (New) The data storage element as set forth in Claim 1, further comprising:

a plurality of host oxide layers, said rare earth metal oxide layer being formed between said plurality of host oxide layers.

45. (New) The data storage element as set forth in Claim 1, wherein rare earth metal oxide layer comprises one of a cerium oxide layer, a yttrium oxide layer, and a praseodymium oxide layer.

46. (New) A memory element, comprising:

a rare earth metal oxide layer having a thickness in a range from 50Å to 500Å and formed on a semiconductor substrate; and

an electrode formed on said rare earth metal oxide layer.